IN THE DRAWINGS:

Please amend FIGS. 1 and 3, as indicated on the attached marked-up copy of original FIGS. 1 and 3. No new matter is introduced.

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REMARKS

The present application was filed on January 15, 2002 with claims 1 through 6. Claims 1-6 are presently pending in the above-identified patent application.

In the Office Action, the Examiner objected to the drawings under 37 CFR
5   1.83(a). The Examiner rejected claim 1 under 35 U.S.C. §103(a) as being unpatentable over Piirainen (United States Patent Number 6,396,878), and further in view of Bar-David et al. (United States Patent Number 5,623,511), and rejected claim 4 under 35 U.S.C. §103(a) as being unpatentable over Critchlow (United States Patent Number 5,276,706), and further in view of Bar-David et al. The Examiner indicated that claims 2, 3, 5, and 6 would be allowable if
10   rewritten in independent form including all of the limitations of the base claims and any intervening claims.

Drawings

The drawings were objected to for not showing every feature of the invention specified in the claims, and because the drawings are missing descriptive labels. In particular,
15   the Examiner asserts that "the predetermined set of symbols and the reference symbols must be shown."

Applicants note that FIG. 2 represents a symbol. A person of ordinary skill in the art would recognize that FIG. 2 is representative of both predetermined symbols and reference symbols. FIGS. 1 and 3 have been amended to include descriptive labels. Applicants believe
20   that these amendments address the Examiner's concerns and respectfully request that the objections to the drawings be withdrawn.

Independent Claims 1 and 4

Independent claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over Piirainen, and further in view of Bar-David et al., and claim 4 is rejected under 35 U.S.C.
25   §103(a) as being unpatentable over Critchlow, and further in view of Bar-David et al. Regarding claim 1, the Examiner asserts that Piirainen teaches generating a set of reference symbols on the basis of the predetermined set of symbols and a channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected
30   symbol for each part of the received signal (col. 13, lines 1-24; col. 16, lines 50-62).

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In the text cited by the Examiner, Piirainen discloses that

the impulse response estimate needed in the metric can be made adaptive. *The means 217 of the receiver then make hard bit decisions concerning the bit likelihood,* coming from the means 208, and/or probability, coming from at least one of the means 212 and 216. Means 221 are used for *generating symbols from the hard bit decisions.* A convolution of the generated symbols and the impulse response estimate is used for generating reference samples, i.e. reference symbols, in the means 218, the samples being compared with the received symbols, i.e. the samples y_i. By means of the differences between the received samples and the reference samples, the impulse response estimate is changed to better correspond to reality and thus to produce a better bit decision. The changed impulse response H is fed to the means 201 in which it is used for forming the metric.

The receiver according to FIG. 3 comprises the means 201 for forming a transition metric, means 302 for forming a cumulative transition metric and means 303 for forming a cumulative metric. In addition, the receiver advantageously comprises means 304 for generating an exponent function. In other respects the receiver is similar to the receiver in FIG. 2. The receiver comprises, at least in principle, a plural number of entities of the means 304 and 204 to 217, their number being advantageously equal to the number of bits needed for symbol coding. The physical number of the means 304 and 204 to 217 can be reduced for instance by means of serial processing.

(Col. 12, line 64, to col. 13, line 24; emphasis added.)

Piirainen further teaches

wherein when an impulse response estimate is available, *received bits are used for making hard bit decisions, bit decisions are used for generating symbols,* said symbols and the impulse response are used for generating reference symbols, the reference symbols are compared with corresponding received symbols by applying the least square sum method, and the result obtained by the comparison of the reference symbols and the received symbols is used for controlling the metric to be used in detection.

(Col. 16, lines 50-62; emphasis added.)

Clearly, Piirainen describes a feedback system and, hence, symbols are created *a posterior.* Piirainen, however, does not disclose or suggest a *predetermined set of symbols* and, therefore, Piirainen does not disclose or suggest *comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols,* yielding a *detected symbol* for each part of the received signal.

Independent claim 1 requires *generating a set of reference symbols on the basis of the predetermined set of symbols* and a channel impulse response between the transmitter and the receiver; and ***comparing each of the successive parts of the received signal, each part***

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having the length of a symbol, *with each of the reference symbols*, *yielding a detected symbol for each part* *of the received signal*.

Thus, Piirainen, Critchlow, and Bar-David, alone or in combination, do not disclose or suggest generating a set of reference symbols on the basis of the predetermined set of

5   symbols and a channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected symbol for each part of the received signal, as required by independent claim 1.

Regarding claim 4, the Examiner asserts that Critchlow discloses which symbol is

10   a selected symbol out of a predetermined set of symbols (FIG. 1, means 36) and wherein each symbol of the predetermined set is modulated according to a modulation coding scheme (col. 5, lines 17-45; col. 7, lines 7-35), wherein the method comprises: filtering the received signal with a filter which yields a filter signal (col. 3, lines 18-41; col. 5, lines 17-45; means 24).

Applicants note that independent claim 4 requires filtering the received signal

15   with a filter which yields a filter signal, wherein the filter is a matched filter to the channel impulse response between the transmitter and the receiver; and *comparing each of the successive parts of the filter signal, each part having the length of a symbol*, with each of the symbols from the predetermined set of symbols *yielding a detected symbol* for each part of the filter signal. The Examiner did not cite a particular section of the Critchlow patent which

20   discloses or suggests comparing each of the successive parts of a filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal, and Applicants could find no such disclosure or suggestion in either Critchlow or Bar-David.

Thus, Piirainen, Critchlow, and Bar-David, alone or in any combination, do not

25   disclose or suggest generating a set of reference symbols on the basis of the predetermined set of symbols and a channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected symbol for each part of the received signal, as required by independent claim 1, and do not disclose or suggest filtering the

30   received signal with a filter which yields a filter signal, wherein the filter is a matched filter to

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the channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal, as required by independent claim 4.

5   <u>Additional Cited References</u>

Bar-David et al. was also cited by the Examiner for disclosing a digital communication system that utilizes PSK modulation, wherein each symbol comprises a sequence of chips.

Applicants note that Bar-David is directed to a spread spectrum code pulse
10 position modulated communication system. (See, Abstract.) Bar-David does not address the issues of generating a set of reference symbols on the basis of a predetermined set of symbols and a channel impulse response between a transmitter and a receiver; comparing each of successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected symbol for each part of the received signal, or filtering a
15 received signal with a filter which yields a filter signal, wherein the filter is a matched filter to the channel impulse response between a transmitter and a receiver; and comparing each of successive parts of the filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal.
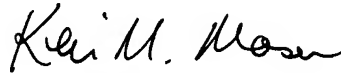
20 Thus, Bar-David et al. do not disclose or suggest generating a set of reference symbols on the basis of the predetermined set of symbols and a channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected symbol for each part of the received signal, as required by independent claim
25 1, and do not disclose or suggest filtering the received signal with a filter which yields a filter signal, wherein the filter is a matched filter to the channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal, as required by independent
30 claim 4.

Conclusion

The rejections of the cited claims under section 103 in view of Piirainen, Critchlow, and Bar-David et al., alone or in any combination, are therefore believed to be improper and should be withdrawn. The Examiner has already indicated that claims 2, 3, 5, and

5   6 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

The attention of the Examiner and the Appeal Board to this matter is appreciated.

Respectfully,

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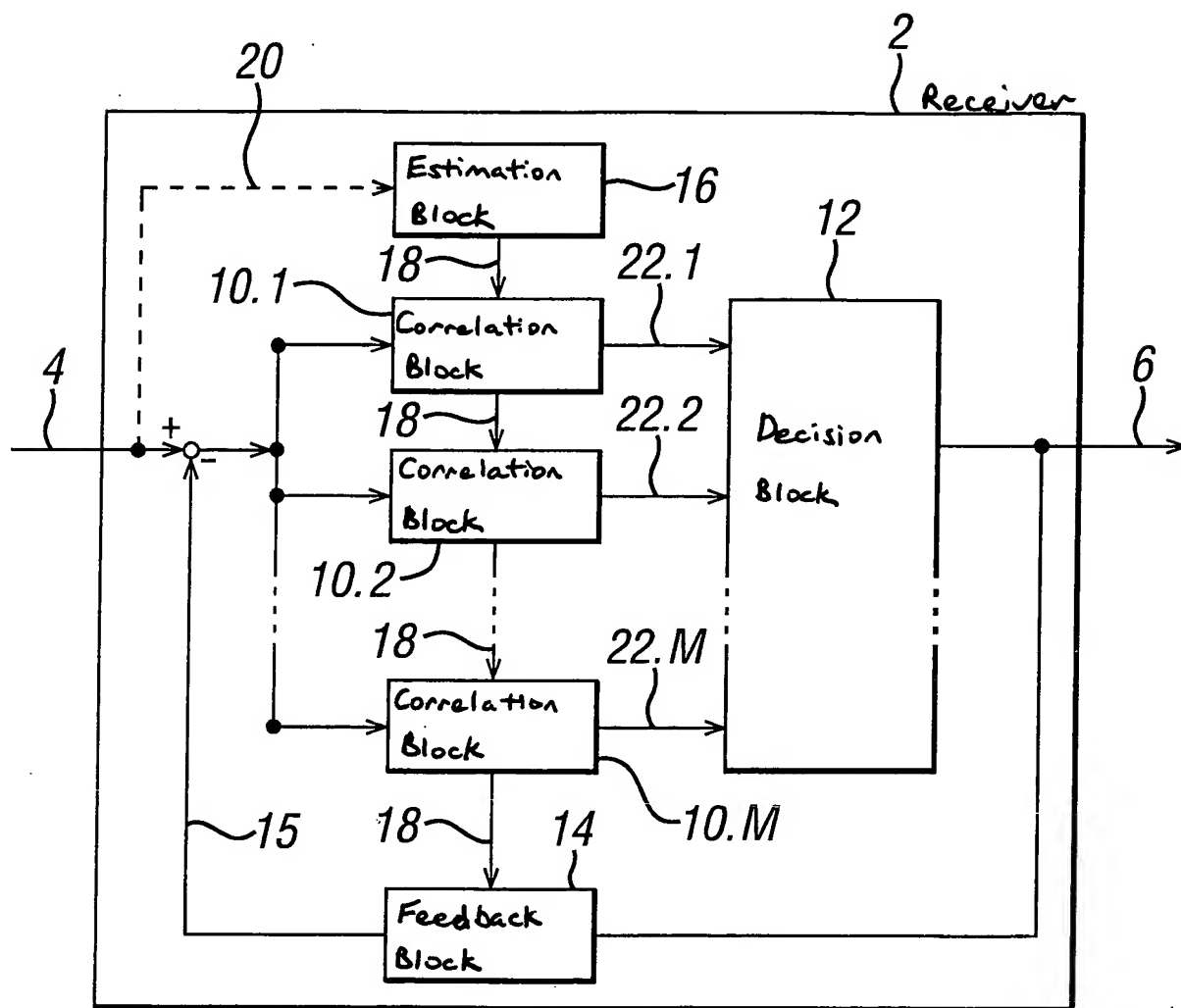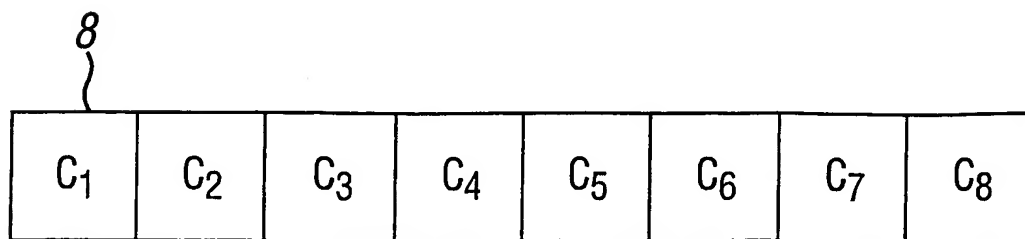   (203) 255-6560

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Annotated Sheet Showing Changes

FIG. 1

FIG. 2

Annotated Sheet Showing Changes

FIG. 3

24 Receiver

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26 Channel Matched Filter Block

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28 Correlator Bank

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30 Correction Block

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32 Decision Block

34 Feed back Block

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